

Decline in numbers of Little Penguin *Eudyptula minor* at Middle Island, Warrnambool, Victoria

Rebecca Overeem¹ and Robert Wallis²

¹ School of Ecology and Environment, Deakin University, Warrnambool, Victoria 3280.

² Office of the Pro Vice-Chancellor (Rural and Regional), Deakin University, Warrnambool, Victoria 3280.

Abstract

Throughout the six years till 2005 Little Penguins *Eudyptula minor* at Middle Island, Warrnambool, have been subjected to intense fox predation. The population of the Little Penguin at Middle Island is now dangerously low, with a reduction from 342 active burrows in 1999 to the current 52 active burrows, and from 502 to 4 Little Penguins arriving at the colony after dusk. Such a reduction in numbers requires urgent management measures in order for the colony to survive. (*The Victorian Naturalist* 124 (1), 2007, 19-22)

Introduction

The Little Penguin *Eudyptula minor* is the smallest of all the penguin species and holds an important position in the functioning of the marine ecosystems across its range (Gales 1989). Endemic to southern Australia and New Zealand (Marchant and Higgins 1990), the Little Penguin enjoys high community appeal and tourism status. The famous 'Penguin Parade' at Phillip Island (Victoria, Australia), with its nightly arrival of Little Penguins, attracts nearly 500 000 visitors annually (Anon. 2005).

Drawn to land for breeding and moulting purposes, Little Penguin pairs typically nest in burrows amongst vegetated sand dunes, tussocks or rock crevices located close to the sea. The Little Penguin is unique as it can breed in isolated pairs or as part of a colony. Consequently, Little Penguin colonies vary in size and situation (Simpson 1972). The Bass Strait area, with about 60% of the known breeding population, is the stronghold for the species in Australia (Dann *et al.* 1996).

Although the Little Penguin is classified as lower risk on the IUCN Red List (Ellis *et al.* 1998), a recent decline in numbers has been documented (Dann 1992). European settlement has greatly modified Little Penguin habitat via agriculture, housing, recreational activities and erosion (Harris and Bode 1981). Other threats include oil pollution, discarded plastic products, and fire. Feral animals are a considerable threat, and in some areas penguins are still deliberately killed for bait. Today in Australia, Little Penguin colonies

are restricted to areas where human disturbance and predation by introduced species are limited, such as offshore islands (Fortescue 1995; Rogers *et al.* 1995; Wienecke *et al.* 1995). The relatively few colonies on the Australian mainland are generally situated at the base of cliffs and areas inaccessible to mammalian carnivores (Dann 1992). Figure 1 shows sites of larger colonies in south-eastern Australia.

Declines in population sizes of Little Penguin colonies have been reported in Sydney (NSW National Parks and Wildlife Service 2000; Department of Environment and Conservation 2006); and in western Victoria at Port Fairy (Marchant and Higgins 1990) and Portland Harbour (Dann *et al.* 1996). Declines have been caused by habitat loss, predation by canids and oil spills. We have previously reported that in 2000, 342 active Little Penguin burrows existed on Middle Island, Warrnambool, but that unregulated human visitation and canid predation were contributing to a population decline (Overeem and Wallis 2003). We documented a loss of 33% of chicks and 16% of eggs during the 1999/2000 breeding season when visitors to the island trampled their burrows. Most recently there have been several occurrences of fox predation at Middle Island, with the most devastating resulting in 268 Little Penguin carcasses being found at the colony.

The aim of this study is to determine the effects that fox predation and human disturbance have had on Middle Island, through assessing population change. We

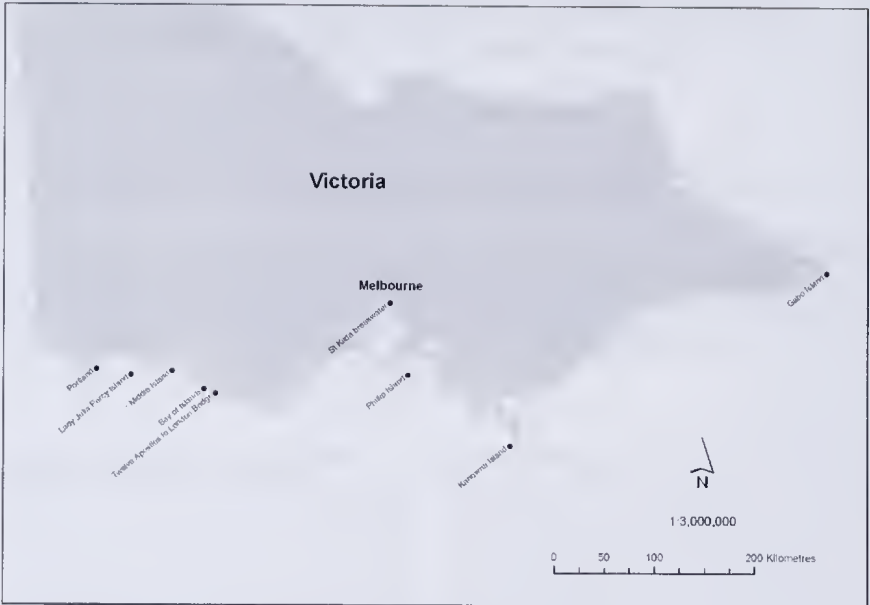


Fig. 1. Location of Middle Island in relation to other known colonies of Little Penguins in south-eastern Australia.

therefore compare our results to the censuses made at Middle Island in 1999/2000.

Materials and methods

Study site

Middle Island, Warrnambool ($38^{\circ}20'S$ $142^{\circ}30'E$) is located along Victoria's south-west coastline, approximately 263 km from Melbourne (Anon. 1999/2000). Locally known as Penguin Island, Middle Island is a 1.5 hectare island situated at the western approach to Lady Bay, at the mouth of the Merri River.

Access to Middle Island is through Stingray Bay, which in the past was deep enough to prevent humans crossing without a boat. The building of a breakwater caused 26 hectares of beaches and subsequent sandbars to form. Today, Middle Island is easily accessed through tide heights of less than 0.1 m, although the adventurous may access the island at any tide.

The Warrnambool City Council (WCC) currently manages Middle Island using advice from Deakin University, the Department of Sustainability and Environment (DSE) and Parks Victoria. In 2002 a boardwalk system was constructed in an effort to protect the Little Penguin

colony. Forty artificial burrows were also introduced to the site. While tide and wave height aid in restricting access, penguin viewing is unregulated.

The Phillip Island Penguin Study Group have flipper-banded Little Penguins at Middle Island since the 1970s, and in October 1993, 336 were banded (Thoday unpublished data). The first ecological study was undertaken by Overeem and Wallis (2003). Notable differences in breeding success, breeding calendar and morphometrics have been recorded between the Middle Island Little Penguin colony and other colonies in the Bass Strait region (Cullen *et al.* 1992; Overeem and Wallis 2003).

Fox predation is not new to Middle Island (see Overeem and Wallis 2003). However, of concern is the current frequency of attacks and number of penguins killed in each. We estimate that just under 500 Little Penguins have been killed by foxes at Middle Island over the past six years, based on counts of carcasses. The Little Penguins utilise six entrances to access the upper surface of Middle Island. The peak dusk arrival was recorded by

Overeem and Wallis (2003) in January 2000 as 502 Little Penguins arriving. Since then many penguin carcasses have been collected from each landing site.

Active burrow abundance map

Fieldwork was undertaken in mid-September as past research suggested the Little Penguins at Middle Island would be nesting, incubating eggs or guarding young chicks (Overeem and Wallis 2003; R. Jessop pers. comm.). This period is thought to result in the most accurate count of breeding pairs (BIOMASS Working Party on Bird Ecology 1982). The nearby colonies at Lady Julia Percy Island and London Bridge were also checked for activity to confirm breeding status in western Victoria. The active burrow mapping was completed as described in Overeem and Wallis (2003) in an effort to efficiently compare data.

Little Penguin night arrival

The Little Penguin night arrival count was undertaken as described in Overeem and Wallis (2003). On the 21 September 2005 the penguins arriving at all six landing sites were counted by experienced penguin personnel. The count lasted one hour and began when the first penguin accessed the island.

Results and discussion

Active burrow count

The vegetated upper surface of Middle Island had 52 active burrows, at a density of 0.003/ m² (Fig. 1). Interestingly, no live birds were seen or heard during the count and therefore all burrows were identified through the presence of tracks or scats. It is therefore possible that the burrows counted may have resulted in an over-estimation of the number of active Little Penguin burrows at Middle Island.

Little Penguin Night Arrival

A total of four Little Penguins were counted accessing Middle Island in a one hour period. One penguin was counted on the 'main landing site' Entrance 3. Two birds were counted arriving at Entrance 4, while another single bird was counted at Entrance 5. No penguins were counted arriving at Entrances 1, 2 and 6 (Fig. 2).



Fig. 2. Active burrow map for the Little Penguin at Middle Island September 2005. Each number represents the total number of active burrows found in the quadrat, ^ represents an active artificial burrow within the quadrat, E represent entrance names.

Decline in population

In January 2000 we recorded 502 penguins arriving on Middle Island and there were 342 active burrows. Clearly there had been a significant decline in penguin numbers by September 2005 when only four birds were observed at their nightly arrival and 52 active burrows present.

Management options

Fox control strategies including regular fox trapping, baiting, shooting and destroying of dens are needed (Anon. 2005). After some frustrating delays, these strategies are being undertaken on the mainland near Middle Island, but it is critical that this level of effort is maintained over a wider area.

There is a need to control visitor access. Our previous study (Overeem and Wallis 2003) highlighted the number of eggs and chicks that humans have trampled, and while erection of boardwalks and the installation of nest boxes would reduce this

impact, the numbers of people and their dogs need to be controlled.

Future changes in numbers of penguins at Middle Island will need to be closely monitored. Since we believe there is migration between colonies (Overeem unpublished data on genetics of colonies, Australian Bird and Bat Banding Scheme unpublished data), there is a possibility of re-colonisation occurring at Middle Island. However, previously existing local colonies which are now extinct (Portland and Griffith Island) suggest that this will not happen readily.

The status of the Little Penguin colony at Middle Island should be reviewed. The declaration of the Manly Point colony as endangered under NSW legislation has merit and a similar scheme for Victoria could highlight species that are facing extinction.

Acknowledgements

This research was undertaken with permission from the Warrnambool City Council and the Department of Sustainability and Environment (permit number 10003374). Thank you to field assistants: Phillip Du Guesclin (DSE), Paul Grey (WCC), Amanda Peucker and Claire McClusky (Deakin University), Tanya Murray and Carissa Logan (PINP). Thank you also to Phillip Du Guesclin (DSE) for breeding data of the Little Penguin at Lady Julia Percy Island and Australian Bird and Bat Banding Scheme for providing flipper band recovery data. Thank you to Dr Ros Jessop for helpful advice on the project and Elisabeth Lundahl- Hegedus for comments on the manuscript. Thank you to the Western Coastal Board for financial assistance.

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Received 2 February 2006; accepted 11 May 2006